WHAT IS CLAIMED IS:

1. A method for manufacturing a spark plug comprising a center electrode, an insulator disposed around the center electrode, a cylindrical metallic shell disposed around the insulator, a ground electrode disposed in opposition to the center electrode so as to form a spark discharge gap therebetween, and a chip of a high melting point metal welded to at least the ground electrode at a position corresponding to the spark discharge gap so as to form a noble-metal spark portion having a discharge face, said method comprising the steps of:

preparing a metallic shell assembly through joining of a root-end portion of the ground electrode to an open end portion of the metallic shell;

forming a zinc-based plating layer containing a predominant amount of zinc on the entire surface of the metallic shell assembly;

removing the zinc-based plating layer from a free-end portion of the ground electrode of the metallic shell assembly covered with the zinc-based plating layer; and

welding the chip of a high melting point metal to the free-end portion of the ground electrode from which the zinc-based plating layer has been removed.

2. A method for manufacturing a spark plug according to claim 1, wherein in said step of removing the zinc-based plating layer, the ground electrode covered with the zinc-

based plating layer is immersed in a remover so as to chemically remove the zinc-based plating layer therefrom.

3. A method for manufacturing a spark plug according to claim 2, wherein the ground electrode covered with the zinc-based plating layer is immersed in an acid remover so as to electrolessly remove the zinc-based plating layer therefrom.

4. A method for manufacturing a spark plug according to claim 3, wherein the acid remover contains at least any one of nitric acid, hydrochloric acid, sulfuric acid, and an organic acid.

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5. A method for manufacturing a spark plug according to claim 4, wherein a mixture of nitric acid and hydrochloric acid is used as the acid remover.

6. A method for manufacturing a spark plug according to claim 2, wherein the ground electrode is immersed in the remover such that a predetermined length of the root-end portion is exposed above a surface of the remover while the remaining free-end portion is submerged in the remover, thereby removing the zinc-based plating layer from the submerged free-end portion.

7. A method for manufacturing a spark plug according to claim 6, wherein the spark plug to be manufactured has a

structure such that the free-end portion of the ground electrode is bent so as to form the spark discharge gap in cooperation with an end portion of the center electrode;

the metallic shell assembly is configured such that the ground electrode before being bent is joined to the metallic shell in such a manner as to extend linearly in an axial direction of the metallic shell assembly; and

the metallic shell assembly is held such that the ground electrode extends downward so as to immerse the free-end portion of the ground electrode in the remover.

8. A method for manufacturing a spark plug according to claim 7, wherein the chip of a high melting point metal contains a predominant amount of Pt and is welded through resistance welding.

9. A method for manufacturing a spark plug according to claim 1, further comprising a step of forming a chromate layer on the zinc-based plating layer through chromate treatment, wherein the chromate treatment is performed after completion of said step of removing the zinc-based plating layer from the free-end portion of the ground electrode.

10. A method for manufacturing a spark plug comprising a center electrode, an insulator disposed around the center electrode, a cylindrical metallic shell disposed around the insulator, and a ground electrode disposed in opposition to

the center electrode so as to form a spark discharge gap therebetween, said method comprising the steps of:

preparing a metallic shell assembly through joining of a root-end portion of the ground electrode to an open end portion of the metallic shell;

forming a zinc-based plating layer containing a predominant amount of zinc on the entire surface of the metallic shell assembly excluding a free-end portion of the ground electrode; and

immersing in a chromate treatment liquid the entire metallic shell assembly which has undergone said step of forming the zinc-based plating layer, thereby subjecting the zinc-based plating layer to chromate treatment.

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11. A method for manufacturing a spark plug according to claim 1, wherein the ground electrode is formed of an Ni-based heat-resistant alloy or an Fe-based heat-resistant alloy.

12. A method for manufacturing a spark plug according to claim 10, wherein the ground electrode is formed of an Ni-based heat-resistant alloy or an Fe-based heat-resistant alloy.

13. A spark plug comprising:

a center electrode;

an insulator disposed around the center electrode;

a metallic shell disposed around the insulator;

a ground electrode disposed in opposition to the center electrode so as to form a spark discharge gap therebetween, the ground electrode being formed of an Ni-based metal containing a predominant amount of Ni or an Fe-based metal containing a predominant amount of Fe; and

a Pt-based metal chip containing a predominant amount of Pt and welded to the ground electrode, wherein

a surface of said metallic shell and a surface of a root-end portion of said ground electrode are covered with a zinc-chromate layer including a zinc-based plating layer containing a predominant amount of zinc and a chromate layer covering the zinc-based plating layer, such that a free-end portion of the ground electrode is exposed;

the Pt-based metal chip is welded to the exposed free-end portion of the ground electrode at a position corresponding to the spark discharge gap so as to form a noble-metal spark portion; and

a diffusion layer, formed at an interface where the noble-metal spark portion and the ground electrode are joined, has a thickness of not less than 10 μm.

14. A spark plug comprising:

a center electrode;

an insulator disposed around the center electrode; a metallic shell disposed around the insulator; and

a ground electrode disposed in opposition to the center electrode so as to form a spark discharge gap therebetween, wherein

a surface of said metallic shell and a surface of a root-end portion of said ground electrode are covered with a zinc-chromate layer including a zinc-based plating layer containing a predominant amount of zinc and a chromate layer covering the zinc-based plating layer, such that a free-end portion of said ground electrode is exposed without being covered with the zinc-based plating layer; and

the chromate layer is formed in such a manner as to cover an axial end face of the zinc-based plating layer with respect to an axial direction of said ground electrode.

15. A spark plug as described in claim 14, wherein a noble metal spark portion is formed by a Pt-based metal chip containing a predominant amount of Pt and provided on at least said ground electrode at a position corresponding to the spark discharge gap whereby; and

a diffusion layer, formed at an interface where the noble-metal spark portion and the ground electrode are joined, has a thickness of not less than 10 μm.